Mobile Musical Interface Specification

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History

Version	Date	Revisions	
1.0.0	Jan. 9th 2007		First Edition
1.0.1	Jan. 12th 2007	2.2.2	"[→]: Octave up each time the directional key is pressed . The new octave is then held." is changed to "[→]: Octave up while pressing the directional key." "[←]: Octave down each time the directional key is pressed . The new octave is then held." is changed to "[←]: Octave down while pressing the directional key." In figure 13, "Held" is eliminated.
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1 Background

The evolution of mobile phone functionality in recent years is quite remarkable. One example is the approach to music, with FM tone generators used for playing ringtones appearing in mobile phones around 1999. Since then, mobile phone tone generators have continued to evolve, reaching sound quality equivalent to that of PC-based softsynths.

Using the numeric keypad for text messaging, mobile phone users—particularly younger users—are able to communicate easily and with great agility. As using the mobile phone keypad as a musical instrument spreads, it is not unimaginable that users could become as virtuosic as on any other musical instrument.

However, if each mobile phone maker independently implements the way the numeric keypad is used to play music, this could mean that a user would have to re-learn a new interface for each mobile phone. This document provides a suggestion for standardizing the user interface specification for using the mobile phone as a musical instrument.

Rather than be restricted to mobile phone devices' numeric keypads, guidelines for also using the QWERTY keypads of mobile phones and PCs as a musical instrument has been appended since version 1.0.3 of this document as Section 3.

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2 User interface for mobile phones as musical instruments (numeric keypad)

2.1 Numeric keypad key assignment

A mobile phone with a numeric keypad has twelve keys in the keypad, as shown in Figure 1.
This specification defines standard assignment of these keys for melodic instruments and drum sets.

Figure 1 Numeric keypad key placement (Reference)

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2.1.1 Numeric keypad key assignment for melodic instruments

The following tables illustrate numeric keypad key assignments for melodic instruments. They define pitch names corresponding to each keypad key number.

2.1.1.1 Melodic Instrument: Default

Key number	Pitch name
1	Root
2	2nd
3	3rd
4	4th
5	5th
6	6th
7	7th
8	8th
9	9th
*	10th
0	11th
#	12th

Figure 2 Numeric keypad key assignment for Melodic Instrument: Default

2.1.1.2 Melodic instrument: Option 1

Key number	Pitch name
1	4th(Oct Down)
2	5th(Oct Down)
3	6th(Oct Down)
4	7th(Oct Down)
5	Root
6	2nd
7	3rd
8	4th
9	5th
*	6th
0	7th
#	8th

Figure 3 Numeric keypad key assignment for Melodic Instrument: Option 1

2.1.1.3 Melodic instrument: Option 2

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Key number	Pitch name
1	Root
2	2nd
3	3rd
4	4th
5	b2nd(#1st)
6	b3rd(#2nd)
7	5th
8	6th
9	7th
*	b5th(#4th)
0	b6th(#5th)
#	b7th(#6th)

Figure 4 Numeric keypad key assignment for Melodic Instrument: Option 2

2.1.1.4 Melodic instrument: Option 3

Key number	Pitch name
1	10th
2	11th
3	12th
4	7th
5	8th
6	9th
7	4th
8	5th
9	6th
*	Root
0	2nd
#	3rd

Figure 5 Numeric keypad key assignment for Melodic Instrument: Option 3

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2.1.1.5 Melodic instrument: Option 4

Key number	Pitch name
1	6th
2	7th
3	8th
4	3rd
5	4th
6	5th
7	7th(Oct Down)
8	Root
9	2nd
*	4th(Oct Down)
0	5th(Oct Down)
#	6th(Oct Down)

Figure 6 Numeric keypad key assignment for Melodic Instrument: Option 4

2.1.1.6 Melodic instrument: Option 5

Key number	Pitch name
1	b5th(#4th)
2	b6th(#5th)
3	b7th(#6th)
4	5th
5	6th
6	7th
7	4th
8	b2nd(#1st)
9	b3rd(#2nd)
*	Root
0	2nd
#	3rd

Figure 7 Numeric keypad key assignment for Melodic Instrument: Option 5

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2.1.2 Numeric keypad key assignment for drum sets

The following tables illustrate standard number key assignments for drum sets. They define drum instruments corresponding to each keypad key number. By defining four drum sets , each using the standard twelve keypad keys, all forty-seven instruments of the GM1 drum set are covered. Four drum set keypad key assignments are defined: Drum Set 1, Drum Set 2, Percussion Set 1 and Percussion Set 2.

2.1.2.1 Drum Set 1

Key number	Instrument name
1	Crash Cymbal 1
2	Splash Cymbal
3	Ride Cymbal 1
4	Hi Tom
5	Low Mid Tom
6	High Floor Tom
7	Acoustic Snare
8	Cowbell
9	Open Hi-Hat
*	Bass Drum 1
0	Side Stick
#	Closed Hi-Hat

Figure 8 Numeric keypad key assignment for Drum Set 1

2.1.2.2 Drum Set 2

Key number	Instrument name
1	Crash Cymbal 2
2	Chinese Cymbal
3	Ride Bell
4	Hi Mid Tom
5	Low Tom
6	Low Floor Tom
7	Electric Snare
8	Hand Clap
9	Ride Cymbal 2
*	Acoustic Bass Drum
0	(Reserved)
#	Pedal Hi-Hat

Figure 9 Numeric keypad key assignment for Drum Set 2

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2.1.2.3 Percussion Set 1

Key number	Instrument name
1	Claves
2	Cabasa
3	VibraSlap
4	Tambourine
5	Low Timbale
6	High Timbale
7	Maracas
8	Hi Bongo
9	Low Bongo
*	Mute Hi Conga
0	Open Hi Conga
#	Low Conga

Figure 10 Numeric keypad key assignment for Percussion Set 1

2.1.2.4 Percussion Set 2

Key number	Instrument name
1	Short Guiro
2	Short Whistle
3	High Agogo
4	Long Guiro
5	Long Whistle
6	Low Agogo
7	Mute Cuica
8	Hi Wood Block
9	Mute Triangle
*	Open Cuica
0	Low Wood Block
#	Open Triangle

Figure 11 Numeric keypad key assignment for Percussion Set 2

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The following table illustrates the division of the forty-seven GM1 drum set instruments between the number key assignments for drum sets.

Key#	Instrument	Drum1	Drum2	Perc.1	Perc.2
35	Acoustic Bass Drum		*		
36	Bass Drum 1	*			
37	Side Stick	0			
38	Acoustic Snare	7			
39	Hand Clap		8		
40	Electric snare		7		
41	Low Floor Tom		6		
42	Closed Hi-Hat	#			
43	High Floor Tom	6			
44	Pedal Hi-Hat		#		
45	Low Tom		5		
46	Open Hi-Hat	9			
47	Low Mid Tom	5			
48	Hi Mid Tom		4		
49	Crash Cymbal 1	1			
50	High Tom	4			
51	Ride Cymbal 1	3			
52	Chinese Cymbal		2		
53	Ride Bell		3		
54	Tambourine			4	
55	Splash Cymbal	2			
56	Cowbell	8			
57	Crash Cymbal 2		1		
58	Vibraslap			3	
59	Ride Cymbal 2		9		
60	Hi Bongo			8	
61	Low Bongo			9	
62	Mute Hi Conga			*	
63	Open Hi Conga			0	
64	Low Conga			#	
65	High Timbale			6	
66	Low Timbale			5	
67	High Agogo				3
68	Low Agogo				6
69	Cabasa			2	
70	Maracas			7	
71	Short Whistle				2
72	Long Whistle				5
73	Short Guiro				1
74	Long Guiro				4
75	Claves			1	
76	Hi Wood Block				8
77	Low Wood Block				0
78	Mute Cuica				7
79	Open Cuica				*
80	Mute Triangle				9
81	Open Triangle				#

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2.2 Directional pad assignment

Pitch ranges greater than one octave can be achieved using the mobile phone's directional pad.
This specification assumes the directional pad to have four arrows: [↑], [↓], [→], and [←].

2.2.1 Directional pad assignment for melodic instruments

This describes the directional pad assignments for the melodic instrument keypad key assignments in Section 2.1.1.

1) For key assignments Default, Option 1, Option 3, and Option 4:

- [↑]: Halftone up (sharp; #) by pressing a number key while holding the [↑] key
  Pitchbend up by pressing the [↑] key while holding a number key (*1)
- [↓]: Halftone down (flat; b) by pressing a number key while holding the [↓] key
  Pitchbend down by pressing the [↓] key while holding a number key
- [→]: Octave up by pressing a number key while holding the [→] key (*2)
  Modulation depth 1 by pressing the [→] key while holding a number key (*3)
- [←]: Octave down by pressing a number key while holding the [←] key
  Modulation depth 2 by pressing the [←] key while holding a number key

2) For key assignments Option 2 and Option 5:

- [↑]: Pitchbend up by pressing the [↑] key while holding a number key (*1)
- [↓]: Pitchbend down by pressing the [↓] key while holding a number key
- [→]: Octave up by pressing a number key while holding the [→] key (*2)
  Modulation depth 1 by pressing the [→] key while holding a number key (*3)
- [←]: Octave down by pressing a number key while holding the [←] key
  Modulation depth 2 by pressing the [←] key while holding a number key

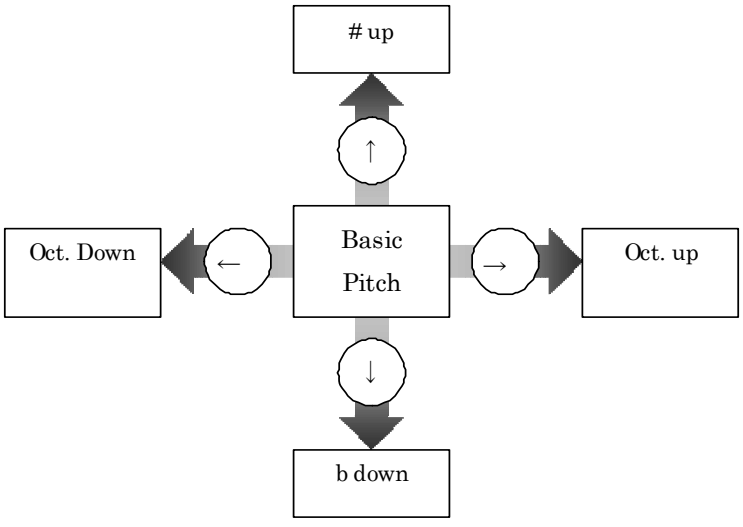

Figure 12 Directional pad assignment for melodic instrument

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[Note]

(*1) Default pitchbend behavior is as follows:

- 2 halftones (200 cents) up/down after the number key has been held for 150ms.
- The tuning resolution is linear cents.

A system can be implemented such that the above values can be changed.

(*2) Alternatively, it is acceptable to implement it such that each time the [←] or [→] key is pressed by itself, the octave is raised or lowered. It is also acceptable to implement the system so that the user can switch between the two implementations described.

(*3) The depth values of modulation depths 1 and 2 can be implemented differently between systems. It is also acceptable to implement a system such that the depth values can be edited

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2.2.2 Directional pad assignment for drum sets

This describes the directional pad assignment for the drum set keypad key assignments detailed in Section 2.1.2.

- [↑]: Volume accent by pressing a number key while pressing the [↑] key.
- [↓]: Change drum set by pressing a number key while pressing the [↓] key.
  - When drum set is Drum Set 1, change to Drum Set 2.
  - When drum set is Drum Set 2, change to Drum Set 1.
  - When drum set is Percussion Set 1, change to Percussion Set 2.
  - When drum set is Percussion Set 2, change to Percussion Set 1.
- [→]: Reserved.
- [←]: Reserved.

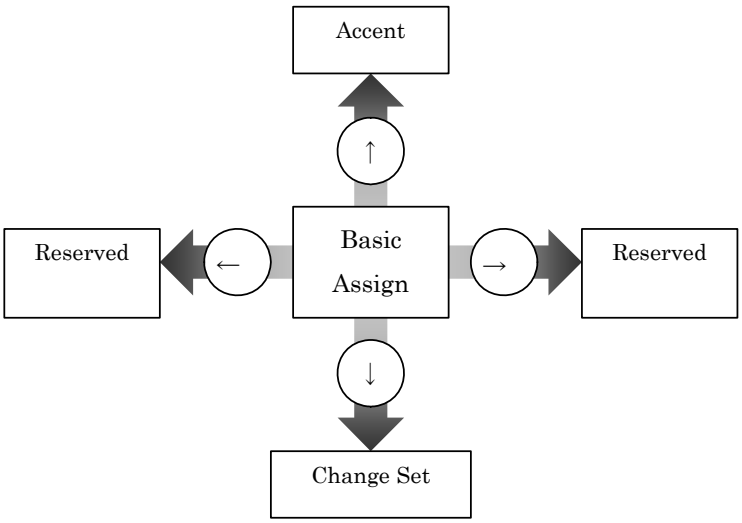

Figure 13 Directional pad assignment for drum sets

[Note]
The volumes of normal notes and accented notes depend on the implementation of the system.

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2.3 Center octave

Center octave is defined for each melodic instrument.

Considering the standard octave provided for in the GM specification to be 0, the table below illustrates the center octave value relative to the GM octave number for each instrument.

Figure 1 Center Octave

PC#	Instrument	Center Oct.	PC#	Instrument	Center Oct.
0	Acoustic Grand Piano	0	32	Acoustic Bass	-2
1	Bright Grand Piano	0	33	Electric Bass (finger)	-2
2	Electric Grand Piano	0	34	Electric Bass (pick)	-2
3	Honky-Tonk Piano	0	35	Fretless Bass	-2
4	Electric Piano 1	0	36	Slap Bass 1	-2
5	Electric Piano 2	0	37	Slap Bass 2	-2
6	Harpsichord	0	38	Synth Bass 1	-2
7	Clavinet	0	39	Synth Bass 2	-2
8	Celesta	+2	40	Violin	+1
9	Glockenspiel	+2	41	Viola	0
10	Music Box	+1	42	Cello	-1
11	Vibraphone	0	43	Contrabass	-2
12	Marimba	+1	44	Tremolo Strings	0
13	Xylophone	+2	45	Pizzicato Strings	0
14	Tubular Bells	0	46	Orchestral Harp	0
15	Dulcimer	0	47	Timpani	-1
16	Drawbar Organ	0	48	String Ensemble 1	0
17	Percussive Organ	0	49	String Ensemble 2	0
18	Rock Organ	0	50	SynthStrings 1	0
19	Church Organ	0	51	SynthStrings 2	0
20	Reed Organ	0	52	Choir Aahs	0
21	Accordion	0	53	Voice Oohs	0
22	Harmonica	0	54	Synth Voice	0
23	Tango Accordion	0	55	Orchestra Hit	0
24	Acoustic Guitar (nylon)	0	56	Trumpet	0
25	Acoustic Guitar (steel)	0	57	Trombone	-1
26	Electric Guitar (jazz)	0	58	Tuba	-2
27	Electric Guitar (clean)	0	59	Muted Trumpet	0
28	Electric Guitar (muted)	0	60	French Horn	0
29	Overdriven Guitar	0	61	Brass Section	0
30	Distortion Guitar	0	62	Synth Brass 1	0
31	Guitar Harmonics	0	63	Synth Brass 2	0

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PC#	Instrument	Center Oct.	PC#	Instrument	Center Oct.
64	Soprano Sax	+1	96	FX 1 (Ice Rain)	0
65	Alto Sax	0	97	FX 2 (Soundtrack)	0
66	Tenor Sax	-1	98	FX 3 (Crystal)	+2
67	Baritone Sax	-2	99	FX 4 (Atmosphere)	+1
68	Oboe	+1	100	FX 5 (Brightness)	+1
69	English Horn	0	101	FX 6 (Goblins)	0
70	Bassoon	-1	102	FX 7 (Echoes)	0
71	Clarinet	0	103	FX 8 (Sci-Fi)	0
72	Piccolo	+2	104	Sitar	0
73	Flute	+1	105	Banjo	0
74	Recorder	+1	106	Shamisen	0
75	Pan Flute	+1	107	Koto	0
76	Blown Bottle	0	108	Kalimba	+1
77	Shakuhachi	0	109	Bag pipe	+1
78	Whistle	+2	110	Fiddle	+1
79	Ocarina	+1	111	Shanai	+1
80	Lead 1 (Square)	+1	112	Tinkle Bell	+2
81	Lead 2 (Sawtooth)	+1	113	Agogo	0
82	Lead 3 (Calliope)	+1	114	Steel Drums	0
83	Lead 4 (Chiff)	+1	115	Woodblock	0
84	Lead 5 (Charang)	+1	116	Taiko Drum	0
85	Lead 6 (Voice)	+1	117	Melodic Tom	0
86	Lead 7 (Fifths)	+1	118	Synth Drum	0
87	Lead 8 (Bass+Lead)	+1	119	Reverse Cymbal	0
88	Pad 1 (New Age)	0	120	Guitar Fret Noise	0
89	Pad 2 (Warm)	0	121	Breath Noise	0
90	Pad 3 (PolySynth)	0	122	Seashore	0
91	Pad 4 (Choir)	0	123	Bird Tweet	0
92	Pad 5 (Bowed)	0	124	Telephone Ring	0
93	Pad 6 (Metallic)	0	125	Helicopter	0
94	Pad 7 (Halo)	0	126	Applause	0
95	Pad 8 (Sweep)	0	127	Gunshot	0

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3 User interface for mobile phones as musical instruments (QWERTY keypad)

3.1 Standard QWERTY keypad range

The QWERTY keypad layout is the de facto standard for the many computers and smartphones that incorporate a Latin character keyboard. Although many computers, smart phones, etc. also include non-Latin characters, such as symbols and numbers, this specification only covers the Latin character keys. This definition also allows for an expanded definition that includes these other keys as well.

3.2 QWERTY keypad key assignment for melodic instruments

The following figures illustrate QWERTY keypad key assignments for melodic instruments. They define pitch names corresponding to each keypad key.

3.2.1 Melodic Instrument: Default

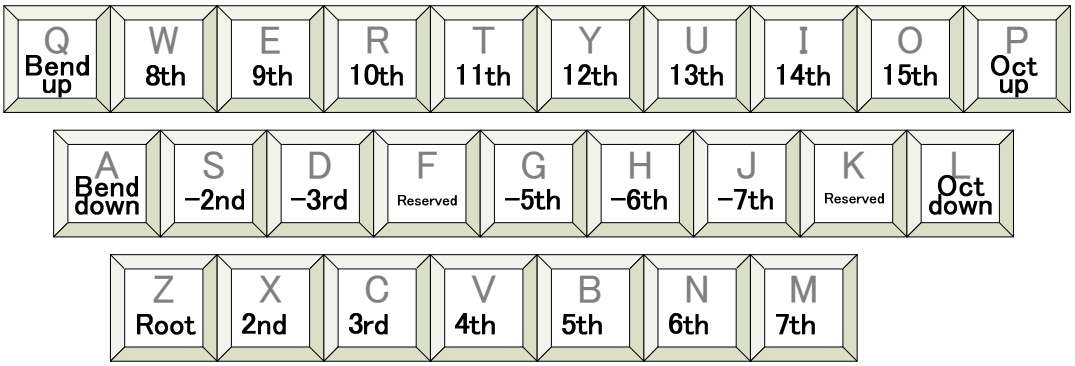

Figure 13 QWERTY keypad key assignment for Melodic Instrument: Default

- Pitchbend up by pressing the [Bend up] key while holding a QWERTY key (*1)
- Pitchbend down by pressing the [Bend down] key while holding a QWERTY key
- Octave up by pressing a QWERTY key while holding the [Oct up] key (*2)
  Modulation depth 1 by pressing the [Oct up] key while holding a QWERTY key
- Octave down by pressing a QWERTY key while holding the [Oct down] key (*2)
  Modulation depth 2 by pressing the [Oct down] key while holding a QWERTY key (*3)

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3.2.2 Melodic Instrument: Option 1

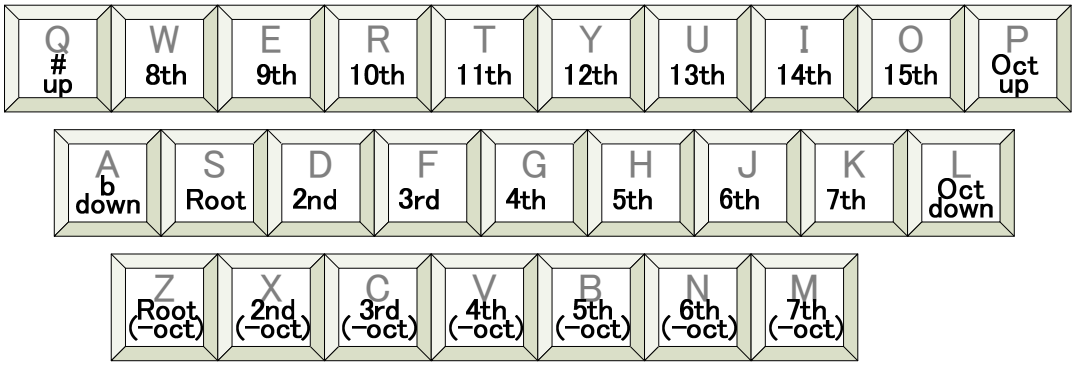

Figure 15 QWERTY keypad key assignment for Melodic Instrument: Option 1

- Halftone up (sharp; #) by pressing a QWERTY key while holding the [# up] key
  Pitchbend up by pressing the [# up] key while holding a QWERTY key (*1)
- Halftone down (flat; b) by pressing a QWERTY key while holding the [b down] key
  Pitchbend down by pressing the [b down] key while holding a QWERTY key
- Octave up by pressing a QWERTY key while holding the [Oct up] key (*2)
  Modulation depth 1 by pressing the [Oct up] key while holding a QWERTY key (*3)
- Octave down by pressing a QWERTY key while holding the [Oct down] key
  Modulation depth 2 by pressing the [Oct down] key while holding a QWERTY key

[3.2.1, 3.2.2 Note]

(*1) Default pitchbend behavior is as follows:

- 2 halftones (200 cents) up/down after the QWERTY key has been held for 150ms.
- The tuning resolution is linear cents.

A system can be implemented such that the above values can be changed.

(*2) Alternatively, it is acceptable to implement it such that each time the [Oct up] and [Oct down] key is pressed by itself, the octave is raised or lowered. It is also acceptable to implement the system so that the user can switch between the two implementations described.

(*3) The depth values of modulation depths 1 and 2 can be implemented differently between systems. It is also acceptable to implement a system such that the depth values can be edited.

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3.3 QWERTY keypad key assignment for drum sets

The following tables illustrate standard QWERTY key assignment for drum sets. They define drum instruments corresponding to each keypad key number.

3.3.1 Drum Set

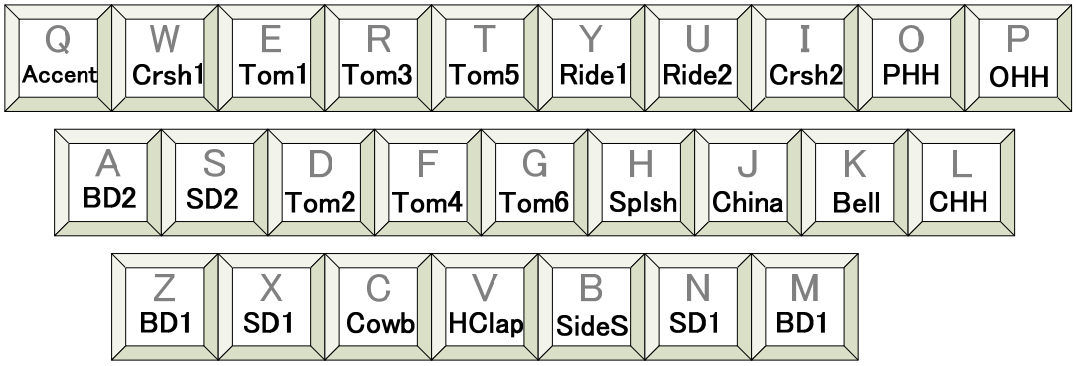

Figure 16 QWERTY keypad key assignment for Drum Set

- Volume accent by pressing a QWERTY key while pressing the [Accent] key.

3.3.2 Percussion Set

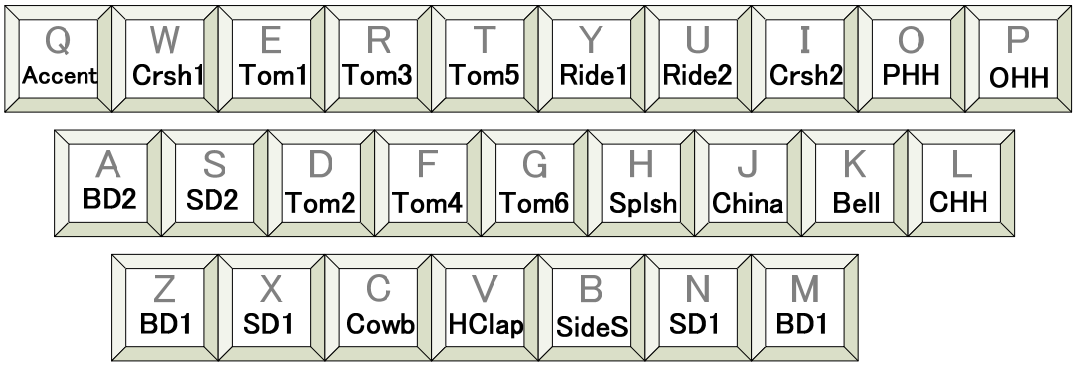

Figure 17 QWERTY keypad key assignment for Percussion Set

- Volume accent by pressing a QWERTY key while pressing the [Accent] key.

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3.4 Alternate standard key assignments

The following tables illustrate alternate QWERTY key assignments that mimic other standard key arrangements. Support for these alternate key assignments are not required.

3.4.1 Mobile phone numeric keypad-like alternate QWERTY key assignment

The following figure illustrates the QWERTY key assignment that mimics the numeric keypad of a mobile phone.

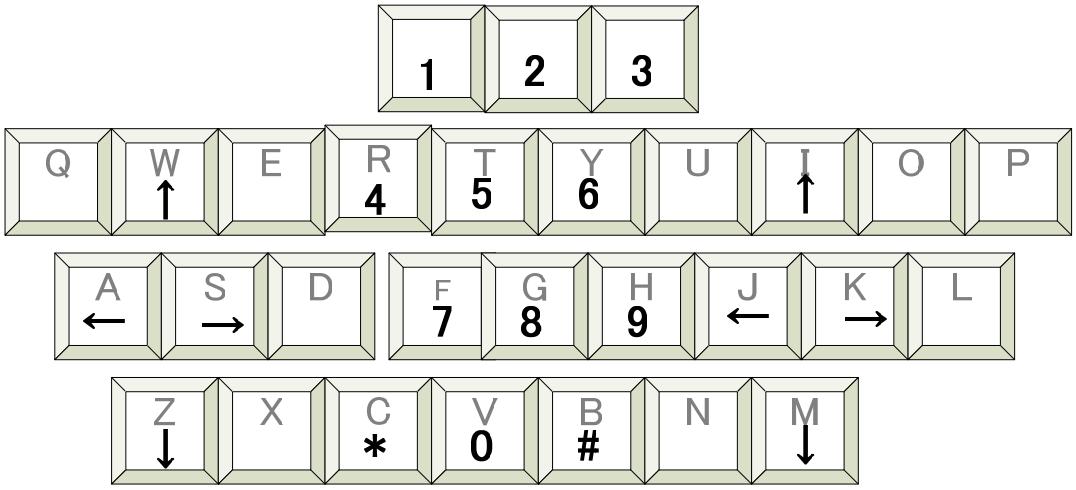

Figure 18 QWERTY keypad key assignment that mimics a mobile phone numeric keypad

3.4.2 PC keyboard-like alternate QWERTY key assignment 1

The following figure illustrates the QWERTY key assignment that mimics the keyboard of a PC.

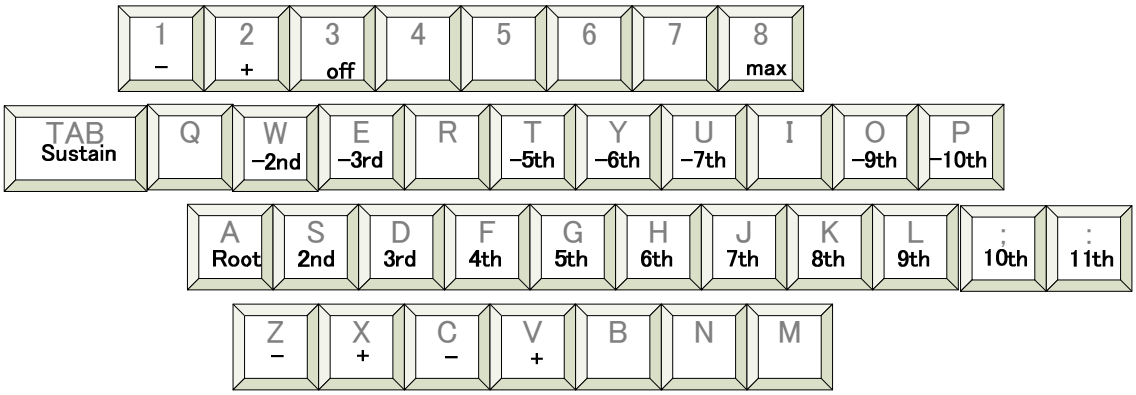

Figure 19 QWERTY keypad key assignment that mimics a PC keyboard

- Bend Up by pressing the [2] key.
- Bend Down by pressing the [1] key.
- Bend Off by pressing the [3] key.
- Modulation on by pressing the [8] key.
- Octave Up by pressing the [X] key. New octave is maintained.
- Octave Down by pressing the [Z] key. New octave is maintained.
- Velocity Up by pressing the [V] key. New velocity is maintained.
- Velocity Down by pressing the [C] key. New velocity is maintained.
- Sustain On by pressing the [Tab] key.

3.5 Center octave

Center octave functions in the same manner described for numeric keypads in Section 2.3.

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4 Guidelines for mobile phone as a musical instrument settings (numeric and QWERTY keypads)

4.1 Recommended settings

The following items are the recommended standard settings for mobile phone as a musical instrument for both numeric and QWERTY keypads,.

4.1.1 Instrument type

Sets the performed type of instrument. Any settings regarding the type of instrument being used provided by content should take priority in determining the type of instrument performed.
Numeric keypad range: Melodic, Drum 1, Drum 2, Percussion 1, Percussion 2
QWERTY keypad range: Melodic, Drum, Percussion
(Default: Melodic)

4.1.2 Keypad key assignment

Sets the performed keypad key assignment. Any settings regarding the keypad key assignment provided by content should take priority in determining the keypad key assignment. This setting is only effective when a melodic instrument has been assigned.
Numeric keypad range: Default, Option 1, Option 2, Option 3, Option 4, Option 5
QWERTY keypad range: Default and Option
(Default: Default)

4.1.3 Root key

Sets the performed root key. Any settings regarding the root key provided by content should take priority in determining the performed root key.
Range: -6～0～+6 (Default: 0 (=C))

4.1.4 Octave

Sets the performed octave. Any settings regarding the octave provided by content should take priority in determining the performed octave.
Range: -5～0～+5 (Default: 0)

4.1.5 Scale

Sets the performed scale type. Any settings regarding the scale type provided by content should take priority in determining the performed scale type.

Scale type setting applies only to the following keypad assignments:
Numeric keypad key assignments for melodic instruments Default, Option 1, Option 3, and Option 4
QWERTY keypad key assignment for melodic instruments Option 1

Range: Major and Natural Minor, (Default: Major)
However, other scales are free to be implemented.

4.1.6 Program number

Sets the performed channel's program number. Any settings regarding the program number provided by content should take priority in determining the performed program number.
Range: 0～127 (Default: 0)

4.1.7 Volume

Sets the performed channel's volume. Any settings regarding the program number provided by content should take priority in determining the performed program number.
Range: 0～127 (Default: Depends on the implementation of the system)

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